

# **NOTIFICATION OF ADDENDUM**

## **ADDENDUM NO. 1**

**DATED 11/01/2004**

<b>Control</b>	<b>0009-09-087, ETC.</b>
<b>Project</b>	<b>CPM 9-9-87, ETC.</b>
<b>Highway</b>	<b>IH 30, ETC.</b>
<b>County</b>	<b>HOPKINS, ETC.</b>

Ladies/Gentlemen:

Attached please find an addendum on the above captioned project. Included in the attachment is an addendum notification which details the changes and the respective proposal pages which were added and/or changed.

Except for new bid insert pages, it is unnecessary to return any of the pages attached.

Bid insert pages must be returned with the bid proposal submitted to the Department, unless your firm is submitting a bid using a computer print out. The computer print out must be changed to reflect the new bid item information.

Contractors and material suppliers, etc. who have previously been furnished informational proposals are not being furnished a copy of the addendum. If you have a subcontractor on the above project, please advise them of this addendum. Acknowledgment of this addendum is not requested if your company has been issued a proposal stamped "This Proposal Issued for Informational Purposes."

You are required to acknowledge receipt of this addendum by entering the date, which appears at the top of this letter on the Addendum Acknowledgement Form, contained in your bid proposal.

Failure to Acknowledge receipt of this addendum in your bid proposal will result in your bid not being read.

04/99

SUBJECT: PLANS AND PROPOSAL ADDENDUMS

PROJECT: CPM 9-9-87

CONTROL: 0009-09-087

COUNTY: HOPKINS

LETTING: 11/10/2004

REFERENCE NO: 1101

**PROPOSAL ADDENDUMS**

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PROPOSAL COVER

X BID INSERTS (SH. NO.: 3-3

)

X GENERAL NOTES (SH. NO.: B THRU E

)

X SPEC LIST (SH. NO.: 2-2

)

X SPECIAL PROVISIONS:

ADDED: 300---087

DELETED:

SPECIAL SPECIFICATIONS:

ADDED:

DELETED:

X OTHER: SEE CHANGES BELOW

DESCRIPTION OF ABOVE CHANGES

(INCLUDING PLANS SHEET CHANGES)

BID INSERT SHEET 3-3, PLAN SHEET 7(E&Q) AND PLAN SHEET 8(QUANTITY SUMMA  
): ADDED ALTERNATE BID ITEMS 316-0786 AND 316-0885

GENERAL NOTES SHEETS B THRU E AND PLAN SHEETS 4 THRU 6: SHEET B (PLAN  
SHEET 4) - ADDED NOTE UNDER ITEM 316; SHEETS C THRU E  
(PLAN SHEETS 5 THRU 6) - DATA SHIFTED DUE TO THIS CHANGE

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	316	0528	004	AGGR (TY PB, GR 4) DOLLARS and CENTS	CY	4,902.000	1
	316	0554	004	AGGR (TY PB GR3) DOLLARS and CENTS	CY	6,641.000	2
	316	0856	004	AGGR (TY PB GR3)(INTER) DOLLARS and CENTS	CY	193.000	3
	316	0857	004	AGGR (TY PB GR 4)(INTER) DOLLARS and CENTS	CY	255.000	4
1	316	0862	004	ASPH (AC-20-5TR) DOLLARS and CENTS	GAL	487,008.000	5
2	316	0870	004	ASPH (AC-20-5TR)(INTER) DOLLARS and CENTS	GAL	19,102.000	6
	500	0501		MOBILIZATION DOLLARS and CENTS	LS	1.000	7
	502	0501	027	BARRICADES, SIGNS AND TRAF HANDLE DOLLARS and CENTS	MO	2.000	8
	662	0581	007	WRK ZN PAV MRK SH TRM (TAB) TY W DOLLARS and CENTS	EA	3,295.000	9
	662	0583	007	WRK ZN PAV MRK SH TRM (TAB) TY Y-2 DOLLARS and CENTS	EA	40,192.000	10
	666	0539	043	REFL PAV MRK TY II (W) (8") (SLD) DOLLARS and CENTS	LF	1,824.000	11

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	666	0544	043	REFL PAV MRK TY II (W) (24") (SLD) DOLLARS and CENTS	LF	1,958.000	12
	666	0545	043	REFL PAV MRK TY II (W) (ARROW) DOLLARS and CENTS	EA	32.000	13
	666	0549	043	REFL PAV MRK TY II (W) (WORD) DOLLARS and CENTS	EA	34.000	14
	666	0553	043	REFL PAV MRK TY II (W) (RR XING) DOLLARS and CENTS	EA	6.000	15
	666	0561	043	REFL PAV MRK TY II (Y) (12") (SLD) DOLLARS and CENTS	LF	2,295.000	16
	666	0638	043	REFL PAV MRK TY II (W) (18") (YLD TRI) DOLLARS and CENTS	LF	230.000	17
	672	0509	012	RAIS PAV MRKR CL B (REFL) TY II-A-A DOLLARS and CENTS	EA	8,552.000	18
	672	0510	012	RAIS PAV MRKR CL B (REFL) TY II-C-R DOLLARS and CENTS	EA	735.000	19
	8975	0537	004	PAV MRK TY II (W) (4") (SLD) DOLLARS and CENTS	LF	373,423.000	20
	8975	0538	004	PAV MRK TY II (W) (4") (BRK) DOLLARS and CENTS	LF	12,773.000	21
	8975	0543	004	PAV MRK TY II (Y) (4") (SLD) DOLLARS and CENTS	LF	428,698.000	22

PROJECT CPM 9-9-87 , ETC.  
COUNTY HOPKINS , ETC.

PROPOSAL SHEET  
TxDOT  
FORM 234

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	8975	0544	004	PAV MRK TY II (Y) (4") (BRK)  DOLLARS CENTS and	LF	55,088.000	23
				ALTERNATE NO. 1A  DOLLARS CENTS and			
	316	0786	004	ASPH (AC-15XP)  DOLLARS CENTS and	GAL	487,008.000	24
				ALTERNATE NO. 2A  DOLLARS CENTS and			
	316	0885	004	ASPH (AC-15XP)(INTER)  DOLLARS CENTS and	GAL	19,102.000	25

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**Control:** 0009-09-087, Etc.

**Highway:** IH 30, Etc.

### **GENERAL NOTES:**

Upon completion of all work provided for in the contract for any individual roadway, the Engineer will make an inspection, and if the work is found to be satisfactory, the Contractor will be released from further maintenance on that portion of the work. Construction signs may not be removed from an accepted highway until the stockpile(s) and staging areas for that roadway have been returned to their preexisting condition. Such partial acceptance will be made in writing, and shall in no way void or alter any terms of the contract.

It is the intent of this contract that the Contractor be responsible for the prosecution of the work, in such a way, as to avoid damage to vehicles resulting from asphalt and loose aggregate. Conformance with the specifications and traffic control plan in the plans is considered a minimum effort and is not intended to absolve the Contractor of any liability, whatsoever, for damage to vehicles as a result of his operations.

The Contractor shall designate a responsible person for receiving and resolving damage claims from the public. This person must be available to receive calls during normal business hours, Monday through Saturday, during the course of this project. Prior to beginning work, this person's name, mailing address, and a telephone number will be furnished to the Engineer to be made available to persons who contact the department with claims.

When wind velocities are sufficient to produce noticeable distortion of the spray from the distribution bar, asphaltic materials shall not be placed.

Prior to moving from one stockpile site to the next, that stockpile site and associated section of roadway shall be cleaned of construction debris and excess gravel, and the site shall be restored to a condition acceptable to the Engineer.

TxDOT will not purchase excess aggregate from the Contractor.

All of the Contractor's signing shall be removed from each job location within five (5) days after the Contractor receives written acceptance from the Engineer for that particular job location.

### **ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC**

The Contractor shall provide Railroad Protective Liability Insurance. The Contractor shall contact railroad representatives at least 72 hours prior to beginning any work on railroad right of way.

### **ITEM 8: PROSECUTION AND PROGRESS**

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**Highway:** IH 30, Etc.

The open season for application of asphalt is from May 15 to September 15.

The latest roadway-start-work date for seal coat is June 1, 2005 and all seal coat work shall proceed in a continuous manner until complete.

### **ITEM 210: FLAT WHEEL ROLLING**

The aggregate shall be rolled with a single pass of a flat wheel roller after application to the roadway. The flat wheel roller will follow behind the pneumatic roller(s) as the final roller.

The flat wheel roller may be either tandem or three wheel, but the resulting pressure shall be between 150 and 200 lbs. per linear inch of the roller width.

All work performed under this item shall not be paid for directly, but shall be considered subsidiary to the various bid items.

### **ITEM 316: SURFACE TREATMENTS**

Variable rate nozzles shall be required and employed on the asphalt distributor. As directed by the Engineer, calibration/verification of the spray bar may be performed by the Engineer, prior to beginning work.

The precoating asphaltic material shall be PG 64-22.

Item 316-786 AC-15XP shall be an alternate bid item for Item 316-862 AC-20-5TR. Item 316-885 AC-15XP (Intersection) shall be an alternate bid item for Item 316-870 AC-20-5TR (Intersection).

The coarse aggregate for the surfaces of the travel lanes shall be a minimum class of "A" as published in the Aggregate Quality-Monitoring Program Rated Source Quality Catalogue.

The aggregate will be evaluated for moisture susceptibility (test method TEX-530-C) following the precoat process. A minimum 1% of antistripping by weight of asphalt, which conforms to the requirements of Item 301, will be required to improve the overall quality of the aggregate.

Seal coat work under this item shall not be conducted later than 1 hour before sunset, unless otherwise approved by the Engineer.

The Contractor shall schedule and control his work so that there is immediate application of mineral aggregate following the application of asphalt. A sufficient number of trucks to cover

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the entire “shot” of asphalt shall be loaded and at the placement site prior to beginning asphalt placement.

Dump trucks used to transport aggregate to the sealing operation, shall be of uniform volume capacity and shall be capable of having a full, level load without exceeding legal vehicle gross weights. Trucks will be measured by the Engineer, prior to beginning work. Weight scale tickets for a single load, for each truck, will be required to demonstrate conformity to this requirement.

The Contractor shall assign a patching crew to work between the haul trucks and prior to the rolling operation to repair any trouble spots.

The primary method of measuring the amount of asphalt used for each shot on this project will be by strapping the asphalt distributor. It is a requirement of this project that the asphalt distributor be equipped with a calibrated dipstick that measures from the bottom of the tank up to the asphalt level. The asphalt distributor shall also be equipped with a bubble-level that is mounted to the structure of the asphalt distributor, in such a way, that it will accurately indicate when the distributor tank is level.

## **ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING**

Type III barricades shall be required at stockpile sites when they are within 30 ft. from the edge of the travel lane. In no case may a stockpile be closer than 16 ft. to the edge of pavement or within an intersection clear sight zone.

The traffic control plan for this project shall consist of the barricades and signing arrangement shown on the plans, the Barricade and Construction Standards and the Traffic Control Plan Sheets and Standards.

The Contractor’s attention is directed to the traffic control details described on TCP (7-1)-98. This sheet includes provisions for certain signs to be installed by the Contractor, which are to remain in place until standard pavement markings are in place. These signs are in addition to the signs and barricades that may be required on the Barricade and Construction Standards.

The Contractor shall provide flaggers, as directed by the Engineer.

The Contractor shall provide and use a pilot car whenever one lane traffic exists in accordance with Item 510. The cycle duration shall not exceed 8 minutes. This work will not be paid for separately, but shall be considered subsidiary to Item 502.

The Contractor shall not begin Item 502, barricades, signs, and traffic handling, on any individual roadway, until both of the following conditions are met:

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- 1 – The Contractor's work schedule is approved by the Engineer.
- 2 – No more than five (5) work days shall pass between the beginning of Item 502 and the actual commencement of the roadway work bid items, for the particular roadway receiving barricades and construction signing.

#### **ITEM 662: WORK ZONE PAVEMENT MARKINGS**

The Contractor shall be responsible for placing flexible reflective roadway tabs in accordance with WZ (STPM)-03, following the seal coat operations.

All roadway surfaces sealed during a work day shall have all work zone tabs in place before sundown.

Prior to acceptance of any roadway, the Contractor shall cut, remove and properly dispose the upright portions of all work zone tabs.

#### **ITEM 666: REFLECTORIZED PAVEMENT MARKINGS**

All pavement markings shall be in accordance with the "Texas Manual On Uniform Traffic Control Devices". A pilot line shall be placed by the Contractor and approved by the Engineer before applying any pavement markings. This work shall not be paid for directly, but shall be considered subsidiary to Item 666.

#### **ITEM 5004: TEMP. EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONTROL**

It is the intent of this contract that no disturbance of vegetation occurs as a result of the Contractor's operations. However, if vegetation is disturbed, the Contractor will be responsible for treating the disturbed area at his expense, as follows:

The Contractor shall place temporary sediment control fence or an alternate material as approved by the Engineer to minimize and control the amount of sediment that might enter receiving waters from the disturbed area(s). The Contractor will be required to maintain the sediment controls to the satisfaction of the Engineer until the disturbed area(s) is stabilized. After the area(s) has been stabilized, the Contractor will be responsible for removing the sediment controls. The location and length of the sediment controls will be determined by the Engineer.

The Contractor will be required to seed the disturbed area(s) with a seeding mixture consisting of 10 lbs. of pure live seed of Bermuda grass per acre and 30 lbs. of pure live

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seed of Foxtail millet per acre. Fertilizer shall be applied to the seeded area(s) at a rate of 0.122 lbs. per square yard. The fertilizer shall have an analysis rate of 3-1-2 (15-5-10 or 21-7-14). The seeded area(s) shall be watered at a minimum rate of 0.25" per week for a minimum duration of 6 weeks.

**ITEM 5519: TRANSPORTABLE CELLULAR TELEPHONE**

The Contractor shall furnish a transportable cellular telephone with a magnetic base exterior antenna.

**ITEM 8975: REFLECTORIZED PAVEMENT MARKINGS WITH RETROREFLECTIVITY REQUIREMENTS**

The Contractor shall use a crew experienced in the application of Type II Reflective Pavement Markings, capable of placing the markings in neat straight lines and in a safe and timely manner.

All pavement markings shall be in accordance with the 2003 Texas Manual on Uniform Traffic Control Devices. A pilot line to re-establish the center of the roadway shall be placed by the Contractor and approved by the Engineer before applying any pavement markings. If the Engineer determines that tabs placed at the existing centerline of the roadway will be sufficient for this purpose, and if the Contractor demonstrates the ability to consistently place centerline markings using alternative techniques, the requirements for the pilot line may be waived by the Engineer. This work shall not be paid for directly, but shall be considered subsidiary to Item 8975.

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PROJECT : CPM 9-9-87, ETC  
HIGHWAY : IH 30, ETC  
COUNTY : HOPKINS, ETC

TEXAS DEPARTMENT OF TRANSPORTATION

**GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS**

ALL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT  
ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF  
----- TRANSPORTATION MARCH 1, 1993.  
STANDARD SPECIFICATIONS ARE INCORPORATED  
INTO THE CONTRACT BY REFERENCE.

ITEMS 1 TO 9 INCL., GENERAL REQUIREMENTS AND COVENANTS  
ITEM 316 SURFACE TREATMENTS (210)(213)(300)(301)(302)(303)  
ITEM 500 MOBILIZATION (5519)  
ITEM 502 BARRICADES, SIGNS AND TRAFFIC HANDLING (510)  
ITEM 662 WORK ZONE PAVEMENT MARKINGS (666)(672)(677)  
ITEM 666 REFLECTORIZED PAVEMENT MARKINGS (677)(678)  
ITEM 672 RAISED PAVEMENT MARKERS (677)(5699)

SPECIAL PROVISIONS: SPECIAL PROVISIONS WILL GOVERN AND TAKE  
----- PRECEDENCE OVER THE SPECIFICATIONS ENUMERATED  
HEREON WHEREVER IN CONFLICT THEREWITH.

SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--2381)  
WAGE RATES  
SPECIAL PROVISION "SMALL BUSINESS ENTERPRISE IN STATE FUNDED  
CONSTRUCTION" (000--3863)  
SPECIAL PROVISION "SCHEDULE OF LIQUIDATED DAMAGES" (000--4025)  
SPECIAL PROVISION "PARTNERING" (000--2169)  
SPECIAL PROVISION TO ITEM 1 (001---182)  
SPECIAL PROVISION TO ITEM 2 (002---106)  
SPECIAL PROVISION TO ITEM 3 (003---065)  
SPECIAL PROVISION TO ITEM 4 (004---014)  
SPECIAL PROVISION TO ITEM 5 (005---027)  
SPECIAL PROVISIONS TO ITEM 6 (006---018)(006---021)  
SPECIAL PROVISIONS TO ITEM 7 (007---004)(007--1059)  
ADDENDUM I TO SPECIAL PROVISION TO ITEM 7 (007--1148)  
SPECIAL PROVISIONS TO ITEM 8 (008---117)(008---244)  
SPECIAL PROVISION TO ITEM 9 (009---062)

SPECIAL PROVISION	TO ITEM	213	(213---001)
SPECIAL PROVISIONS	TO ITEM	300	(300---081) (300---087)
SPECIAL PROVISION	TO ITEM	301	(301---002)
SPECIAL PROVISION	TO ITEM	302	(302---019)
SPECIAL PROVISION	TO ITEM	303	(303---006)
SPECIAL PROVISION	TO ITEM	316	(316---004)
SPECIAL PROVISION	TO ITEM	318	(318---009)
SPECIAL PROVISION	TO ITEM	502	(502---027)
SPECIAL PROVISION	TO ITEM	662	(662---007)
SPECIAL PROVISION	TO ITEM	666	(666---043)
SPECIAL PROVISION	TO ITEM	672	(672---012)
SPECIAL PROVISION	TO SPECIAL SPECIFICATION ITEM	8975	(8975--004)

SPECIAL SPECIFICATIONS:

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ITEM 3669	INCENTIVE FOR USE OF LOW EMISSION DIESEL IN NONATTAINMENT AND AFFECTED COUNTIES
ITEM 3719	NONATTAINMENT AND NEAR NONATTAINMENT AREAS INCENTIVE FOR USING NON-ROAD DIESEL EQUIPMENT POWERED BY EPA TIER 1, 2 AND 3 DIESEL ENGINES
ITEM 5004	TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONTROL
ITEM 5519	TRANSPORTABLE CELLULAR TELEPHONES
ITEM 5699	EPOXY AND ADHESIVES
ITEM 8975	REFLECTORIZED PAVEMENT MARKINGS WITH RETROREFLECTIVE REQUIREMENTS (316) (318) (502) (677) (678)

GENERAL: THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH  
 ----- PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER  
 PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-  
 LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL  
 PROVISIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFI-  
 CATIONS FOR THIS PROJECT.

**SPECIAL PROVISION****300---087****Asphalts, Oils and Emulsions**

For this project, Item 300, “Asphalts, Oils and Emulsions,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

All Articles are voided and replaced by the following:

**300.1. Description.** Provide asphalt cements, cutback and emulsified asphalts, performance graded asphalt binders, and other miscellaneous asphaltic materials as specified in the plans.

**300.2. Materials.** Provide asphaltic materials that meet the stated requirements when tested in accordance with the referenced Department, AASHTO, and ASTM test methods. Refer to *Materials Inspection Guide*, “Section 11. Asphalt Inspection, Quality Control and Quality Assurance,” for sampling and testing requirements.

Acronyms used in this Item are defined in Table 1.

**Table 1**  
**Acronyms**

Acronym	Definition	Acronym	Definition
Test Procedure Designation Tex T D	Department AASHTO ASTM	Polymer Modifier Designations SBR or L SBS  TR  P	Styrene-Butadiene Rubber (Latex) Styrene-Butadiene-Styrene Block Co-Polymer Tire Rubber, from ambient temperature grinding of truck and passenger tires Polymer Modified
AC	Asphalt Cement	SS	Slow Setting
RC	Rapid Curing	H-suffix	Harder Residue (Lower Penetration)
MC	Medium Curing	AE	Asphalt Emulsion
SCM	Special Cutback Material	S-suffix	Stockpile Usage
HF	High Float	AE-P	Asphalt Emulsion Prime
C	Cationic	EAP&T	Emulsified Asphalt Prime and Tack
RS	Rapid Setting	PCE	Prime, Cure, and Erosion Control
MS	Medium Setting	PG	Performance Grade

- A. Asphalt Cement.** Asphalt cement must be homogeneous, water-free, and nonfoaming when heated to 347°F, and must meet Table 2 requirements.

**Table 2**  
**Asphalt Cement**

Viscosity Grade		AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity											
140°F, Poise	T 202	40	80	100	200	250	350	400	600	800	1200
275°F, Poise	T 202	0.4	-	0.7	-	1.1	-	1.4	-	1.9	-
Penetration, 77°F, 100 g, 5 sec.	T 49	350	-	250	-	210	-	135	-	85	-
Flash Point, C.O.C., °F	T 48	425	-	425	-	425	-	425	-	450	-
Solubility in Trichloroethylene, %	T 44	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-
Spot Test	Tex-509-C	neg.		neg.		neg.		neg.		neg.	
Tests on Residue from Thin Film Oven Test:	T 179										
Viscosity, 140°F, Poise	T 202	-	180	-	450	-	900	-	1500	-	3000
Ductility <sup>1</sup> , 77°F, 5cm/min., cm	T 51	100	-	100	-	100	-	100	-	100	-

<sup>1</sup>If AC-0.6 or AC-1.5 Ductility at 77°F is less than 100 cm, material is acceptable if Ductility at 60°F is more than 100 cm.

- B. Polymer Modified Asphalt Cement.** Polymer modified asphalt cement must be smooth, homogeneous, and comply with the requirements of Table 3. If requested, supply samples of the base asphalt cement and polymer additives.

**Table 3**  
**Polymer Modified Asphalt Cement**

Polymer Modified Viscosity Grade		AC-5 w/2% SBR		AC-10 w/2% SBR		AC-15P		AC-15XP		AC-20-5TR	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Polymer		SBR		SBR		SBS		SBS		Tire Rubber	
Polymer Content, % (solids basis)	Tex-533-C	2.0	-	2.0	-	3.0	-	3.0	-	5.0	-
Dynamic Shear, G*/sin(delta), 64°C, 10 rad/s, kPa	T315	-	-	-	-	-	-	-	-	1.0	-
Viscosity											
140°F, Poise	T 202	700	-	1300	-	1500	-	1500	-	2000	-
275°F, Poise	T 202	-	7.0	-	8.0	-	8.0	-	8.0	-	10.0
Penetration, 77°F, 100 g, 5 sec.	T 49	120	-	80	-	100	150	100	150	75	115
Ductility, 5cm/min., 39.2°F, cm	T 51	70	-	60	-	-	-	40	-	-	-
Elastic Recovery, 50°F, %	Tex-539-C	-	-	-	-	55	-	55	-	55	-
Softening Point, °F	T 53	-	-	-	-	-	-	-	-	120	-
Polymer Separation, 48 hrs.	Tex-540-C	None		None		None		None		None	
Flash Point, C.O.C., °F	T 48	425	-	425	-	425	-	425	-	425	-
Tests on Residue from Thin Film Oven Test:	T179										
Retained Penetration Ratio, 77°F	T 49	-	-	-	-	0.60	1.00	0.60	1.00	0.6	1.00
Tests on Residue from Pressure Aging Vessel (After RTFO Aging):	Tex-541-C										
Bending Beam Rheometer	R28										
Creep Stiffness, -18°C, MPa	T313	-	-	-	-	-	-	-	-	-	300
m-value, -18°C		-	-	-	-	-	-	-	-	0.300	-

- C. Cutback Asphalt.** Cutback asphalt must meet the requirements of Tables 4, 5, and 6 for the specified type and grade. If requested, supply samples of the base asphalt cement and polymer additives.

**Table 4**  
**Rapid Curing Cutback Asphalt**

Type – Grade		RC-250		RC-800		RC-3000	
Property	Test Procedure	Min	Max	Min	Max	Min	Max
Kinematic Viscosity, 140°F, cSt	T 201	250	400	800	1600	3000	6000
Water, %	T 55	-	0.2	-	0.2	-	0.2
Flash Point, T.O.C., °F	T 79	80	-	80	-	80	-
Distillation Test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		40	75	35	70	20	55
to 500°F		65	90	55	85	45	75
to 600°F		85	-	80	-	70	-
Residue from distillation, volume %		70	-	75	-	82	-
Tests on Distillation Residue:							
Penetration, 100 g, 5 sec., 77°F	T 49	80	120	80	120	80	120
Ductility, 5 cm/min., 77°F, cm	T 51	100	-	100	-	100	-
Solubility in Trichloroethylene, %	T 44	99.0	-	99.0	-	99.0	-
Spot Test	Tex-509-C	neg.		neg.		neg.	

**Table 5**  
**Medium Curing Cutback Asphalt**

Type-Grade		MC-30		MC-250		MC-800		MC-3000	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max
Kinematic Viscosity, 140°F, cSt	T 201	30	60	250	500	800	1600	3000	6000
Water, %	T 55	-	0.2	-	0.2	-	0.2	-	0.2
Flash Point, T.O.C., °F	T 79	100	-	150	-	150	-	150	-
Distillation Test:	T 78								
Distillate, percentage by volume of total distillate to 680°F									
to 437°F		-	25	-	10	-	-	-	-
to 500°F		40	70	15	55	-	35	-	15
to 600°F		75	93	60	87	45	80	15	75
Residue from distillation, volume %		50	-	67	-	75	-	80	-
Tests on Distillation Residue:									
Penetration, 100 g, 5 sec., 77°F	T 49	120	250	120	250	120	250	120	250
Ductility, 5 cm/min., 77°F, cm <sup>1</sup>	T 51	100	-	100	-	100	-	100	-
Solubility in Trichloroethylene, %	T 44	99.0	-	99.0	-	99.0	-	99.0	-
Spot Test	Tex-509-C	neg.		neg.		neg.		neg.	

<sup>1</sup>If the Penetration of residue is more than 200 and the Ductility at 77°F is less than 100 cm, the material is acceptable if its Ductility at 60°F is more than 100 cm.

**Table 6**  
**Special Use Cutback Asphalt**

Type-Grade		MC-2400L		SCM I		SCM II	
Property	Test Procedure	Min	Max	Min	Max	Min	Max
Kinematic Viscosity, 140°F, cSt	T 201	2400	4800	500	1000	1000	2000
Water, %	T 55	-	0.2	-	0.2	-	0.2
Flash Point, T.O.C., °F	T 79	150	-	175	-	175	-
Distillation Test:	T 78						
Distillate, percentage by volume of total distillate to 680°F to 437°F		-	-	-	-	-	-
to 500°F		-	35	-	0.5	-	0.5
to 600°F		35	80	20	60	15	50
Residue from distillation, volume %		78	-	76	-	82	-
Tests on Distillation Residue:							
Polymer		SBR		-		-	
Polymer Content, % (solids basis)	Tex-533-C	2.0	-	-	-	-	-
Penetration, 100 g, 5 sec., 77°F	T 49	150	300	180	-	180	-
Ductility, 5 cm/min., 39.2°F, cm	T 51	50	-	-	-	-	-
Solubility in Trichloroethylene, %	T 44	99.0	-	99.0	-	99.0	-

- D. Emulsified Asphalt.** Emulsified asphalt must be homogeneous, does not separate after thorough mixing, and must meet the requirements for the specified type and grade in Tables 7, 8, 9, and 10.

**Table 7**  
**Emulsified Asphalt**

Type-Grade		Rapid Setting		Medium Setting				Slow Setting			
		HFRS-2		MS-2		AES-300		SS-1		SS-1H	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72										
77°F, sec.		-	-	-	-	75	400	20	100	20	100
122°F, sec.		150	400	100	300	-	-	-	-	-	-
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Miscibility	T 59	-	-	-	-	-	-	pass	pass	pass	pass
Cement Mixing, %	T 59	-	-	-	-	-	-	-	2.0	-	2.0
Coating Ability and Water Resistance:	T 59										
dry aggregate/after spray		-	-	-	-	good/fair	good/fair	-	-	-	-
wet aggregate/after spray		-	-	-	-	fair/fair	fair/fair	-	-	-	-
Demulsibility, 35 ml of 0.02 N CaCl <sub>2</sub> , %	T 59	50	-	-	30	-	-	-	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1
Freezing Test, 3 cycles <sup>1</sup>	T 59	-	-	pass	pass	-	-	pass	pass	pass	pass
Distillation Test:	T 59										
Residue by Distillation, % by wt.		65	-	65	-	65	-	60	-	60	-
Oil Distillate, % by volume of emulsion		-	0.5	-	0.5	-	5	-	0.5	-	0.5
Tests on Residue from Distillation:											
Penetration, 77°F, 100 g, 5 sec.	T 49	100	140	120	160	300	-	120	160	70	100
Solubility in Trichloroethylene, %	T 44	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Ductility, 77°F, 5 cm/min., cm	T 51	100	-	100	-	-	-	100	-	80	-
Float Test, 140°F, sec.	T 50	1200	-	-	-	1200	-	-	-	-	-

<sup>1</sup>Applies only when the Engineer designates material for winter use.

**Table 8**  
**Cationic Emulsified Asphalt**

Type-Grade		Rapid Setting				Medium Setting				Slow Setting			
		CRS-2		CRS-2H		CMS-2		CMS-2S		CSS-1		CSS-1H	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec.	T 72	-	-	-	-	-	-	-	-	20	100	20	100
		150	400	150	400	100	300	100	300	-	-	-	-
122°F, sec.													
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Cement Mixing, %	T 59	-	-	-	-	-	-	-	-	-	2.0	-	2.0
Coating Ability and Water Resistance:	T 59												
dry aggregate/after spray		-	-	-	-	good/fair	good/fair	good/fair	good/fair	-	-	-	-
wet aggregate/after spray		-	-	-	-	fair/fair	fair/fair	fair/fair	fair/fair	-	-	-	-
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	70	-	70	-	-	-	-	-	-	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1	-	1
Particle Charge	T 59	positive	positive	positive	positive	positive	positive	positive	positive	positive	positive	positive	positive
Distillation Test:	T 59												
Residue by Distillation, % by wt.		65	-	65	-	65	-	65	-	60	-	60	-
Oil Distillate, % by volume of emulsion		-	0.5	-	0.5	-	7	-	5	-	0.5	-	0.5
Tests on Residue from Distillation:													
Penetration, 77°F, 100 g, 5 sec.	T 49	120	160	70	110	120	200	300	-	120	160	70	110
Solubility in Trichloroethylene, %	T 44	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Ductility, 77°F, 5 cm/min., cm	T 51	100	-	80	-	100	-	-	-	100	-	80	-

**Table 9**  
**Polymer Modified Emulsified Asphalt**

Type-Grade		Rapid Setting				Medium Setting						Slow Setting	
		RS-1P		HFRS-2P		AES-150P		AES-300P		AES-300S		SS-1P	
Property	Test Procedure	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec.	T 72	-	-	-	-	75	400	75	400	75	400	30	100
122°F, sec.		50	200	150	400	-	-	-	-	-	-	-	-
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Miscibility	T 59	-		-		-		-		-		pass	
Coating Ability and Water Resistance:	T 59												
dry aggregate/after spray		-		-		good/fair		good/fair		good/fair		-	
wet aggregate/after spray		-		-		fair/fair		fair/fair		fair/fair		-	
Demulsibility, 35 ml of 0.02 N CaCl <sub>2</sub> , %	T 59	60	-	50	-	-	-	-	-	-	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1	-	1
Breaking Index, g	Tex-542-C	-	80	-	-	-	-	-	-	-	-	-	-
Distillation Test: <sup>1</sup>	T 59												
Residue by Distillation, % by wt.		65	-	65	-	65	-	65	-	65	-	60	-
Oil Distillate, % by volume of emulsion		-	3	-	0.5	-	3	-	5	-	7	-	0.5
Tests on Residue from Distillation:													
Polymer Content, wt. % (solids basis)	Tex-533-C	-	-	3.0	-	-	-	-	-	-	-	3.0	-
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	140	150	300	300	-	300	-	100	140
Solubility in Trichloroethylene, %	T 44	97.0	-	97.0	-	97.0	-	97.0	-	97.0	-	97.0	-
Viscosity, 140°F, Poise	T 202	-	-	1500	-	-	-	-	-	-	-	1300	-
Float Test, 140°F, sec.	T 50	-	-	1200	-	1200	-	1200	-	1200	-	-	-
Ductility <sup>2</sup> , 39.2°F, 5 cm/min., cm	T 51	-	-	50	-	-	-	-	-	-	-	50	-
Elastic Recovery <sup>2</sup> , 50°F, %	Tex-539-C	55	-	55	-	-	-	-	-	-	-	-	-
Tests on RTFO Curing of Distillation Residue:													
Elastic Recovery, 50°F, %	Tex-541-C Tex-539-C	-	-	-	-	50	-	50	-	30	-	-	-

<sup>1</sup>Exception to AASHTO T 59: Bring the temperature on the lower thermometer slowly to 350°F ± 10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from the first application of heat.

<sup>2</sup>HFRS-2P must meet one of either the Ductility or Elastic Recovery requirements.

**Table 10**  
**Polymer Modified Cationic Emulsified Asphalt**

Type-Grade		Rapid Setting				Slow Setting	
		CRS-1P		CRS-2P		CSS-1P	
Property	Test Procedure	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec.	T 72	-	-	-	-	20	100
122°F, sec.		50	150	250	500	-	-
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	60	-	70	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	1
Breaking Index, g	Tex-542-C	-	80	-	-	-	-
Particle Charge	T 59	positive		positive		positive	
Distillation Test: <sup>1</sup>	T 59						
Residue by Distillation, % by wt.		65	-	65	-	62	-
Oil Distillate, % by volume of emulsion		-	3	-	0.5	-	0.5
Tests on Residue from Distillation:							
Polymer Content, wt. % (solids basis)	Tex-533-C	-	-	3.0	-	3.0	-
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	150	55	90
Viscosity, 140°F, Poise	T 202	-	-	1300	-	-	-
Solubility in Trichloroethylene, %	T 44	97.0	-	97.0	-	97.0	-
Softening Point, °F	T 53	-	-	-	-	135	-
Ductility, 77°F, 5 cm/min., cm	T 51	-	-	-	-	70	-
Ductility <sup>2</sup> , 39.2°F, 5 cm/min., cm	T 51	-	-	-	-	-	-
Elastic Recovery <sup>2</sup> , 50°F, %	Tex-539-C	45	-	60	-	-	-

<sup>1</sup>Exception to AASHTO T 59: Bring the temperature on the lower thermometer slowly to 350°F ± 10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from the first application of heat.

<sup>2</sup>CRS-2P must meet one of either the Ductility or Elastic Recovery requirements.

**E. Specialty Emulsions.** Specialty emulsions may be either asphalt-based or resin-based and must meet the requirements of Table 11.

**Table 11**  
**Specialty Emulsions**

Type-Grade		Medium Setting				Slow Setting	
		AE-P		EAP&T		PCE <sup>1</sup>	
Property	Test Procedure	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec.	T 72	-	-	-	-	10	100
122°F, sec.		15	150	-	-	-	-
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1
Miscibility <sup>2</sup>	T 59	-	-	pass	pass	pass	pass
Demulsibility, 35 ml of 0.10 N CaCl <sub>2</sub> , %	T 59	-	70	-	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	-
Particle Size, % by volume < 2.5 µm	Tex-238-F <sup>3</sup>	-	-	90	-	-	-
Asphalt Emulsion Distillation to 500°F followed by Cutback Asphalt Distillation of Residue to 680°F:	T 59 & T 78						
Residue after both Distillations, % by wt.		40	-	-	-	-	-
Total Oil Distillate from both distillations, % by volume of emulsion		25	40	-	-	-	-
Distillation:	T 59						
Residue by Distillation, % by wt.		-	-	60	-	-	-
Evaporation: <sup>4</sup>	T 59						
Residue by Evaporation, % by wt.		-	-	-	-	60	-
Tests on Residue after all Distillation(s):							
Viscosity, 140°F, Poise	T 202	-	-	800	-	-	-
Kinematic Viscosity, 140°F, cSt	T 201	-	-	-	-	100	350
Flash Point, C.O.C., °F	T 48	-	-	-	-	400	-
Solubility in Trichloroethylene, %	T 44	97.5	-	-	-	-	-
Float Test, 122°F, sec.	T 50	50	200	-	-	-	-

<sup>1</sup>Supply with each shipment of PCE:

- a) a copy of a lab report from an approved analytical lab, signed by a lab official, indicating the PCE formulation does not meet any characteristics of a Resource Conservation Recovery Act (RCRA) hazardous waste;
- b) a certification from the producer that the formulation supplied does not differ from the one tested and that no listed RCRA hazardous wastes or PCB's have been mixed with the product; and
- c) a Material Safety Data Sheet.

<sup>2</sup>Exception to AASHTO T 59: In dilution, use 350 ml of distilled or deionized water and a 1000-ml beaker.

<sup>3</sup>Use Tex-238-F, beginning at "Particle Size Analysis by Laser Diffraction," with distilled or deionized water as a medium and no dispersant, or other approved method.

<sup>4</sup>Exception to AASHTO T 59: Leave sample in the oven until foaming ceases, then cool and weigh.

- F. Recycling Agent.** Recycling agent and emulsified recycling agent must meet the requirements in Table 12. Additionally, recycling agent and residue from emulsified recycling agent, when added in the specified proportions to the recycled asphalt, must meet the properties specified on the plans.

**Table 12**  
**Recycling Agent and Emulsified Recycling Agent**

Property	Test Procedure	Recycling Agent		Emulsified Recycling Agent	
		Min	Max	Min	Max
Viscosity, Saybolt Furol, 77°F, sec.	T 72	-	-	15	100
Sieve Test, %	T 59	-	-	-	0.1
Miscibility <sup>1</sup>	T 59	-	-	No Coagulation	
Evaporation Test: <sup>2</sup> Residue by Evaporation, % by wt.	T 59	-	-	60	-
Tests on Recycling Agent or Residue from Evaporation: Flash Point, C.O.C., °F	T 48	400	-	400	-
Kinematic Viscosity, 140°F, cSt	T 201	75	200	75	200
275°F, cSt		-	10.0	-	10.0

<sup>1</sup>Exception to AASHTO T 59: Use 0.02 N CaCl<sub>2</sub> solution in place of water.

<sup>2</sup>Exception to AASHTO T 59: Maintain sample at 300°F until foaming ceases, then cool and weigh.

- G. Crumb Rubber Modifier.** Crumb rubber modifier (CRM) consists of automobile and truck tires processed by ambient temperature grinding.

CRM must be:

- free from contaminants including fabric, metal, mineral and other nonrubber substances;
- free-flowing; and
- nonfoaming when added to hot asphalt binder.

When tested in accordance with Test Method Tex-200-F, Part I, using a 50-gram sample, the rubber gradation must meet the requirements of the grades in Table 13.

**Table 13**  
**Crumb Rubber Modifier Gradations**

CRM Grade	Grade A		Grade B		Grade C		Grade D	Grade E
Sieve Size / Percent Passing	Min	Max	Min	Max	Min	Max		
#8	100	-	-	-	-	-	As Shown On The Plans	As Approved
#10	95	100	100	-	-	-		
#16	-	-	70	100	100	-		
#30	-	-	25	60	90	100		
#40	-	-	-	-	45	100		
#50	0	10	-	-	-	-		
#200	-	-	0	5	-	-		

**H. Crack Sealer.** Polymer modified asphalt-emulsion crack sealer must meet the requirements of Table 14. Rubber-asphalt crack sealer must meet the requirements of Table 15.

**Table 14**  
**Polymer Modified Asphalt Emulsion Crack Sealer**

Property	Test Procedure	Min	Max
Rotational Viscosity, 77°F, cP	ASTM D 2196, Method A	10,000	25,000
Sieve Test, %	T 59	-	0.1
Storage Stability, 1 day, %	T 59	-	1
Evaporation	Tex-543-C		
Residue by Evaporation, % by wt.		65	-
Tests on Residue from Evaporation:			
Penetration, 77°F, 100 g, 5 sec.	T 49	35	75
Softening Point, °F	T 53	140	-
Ductility, 39.2°F, 5 cm/min., cm	T 51	100	-

**Table 15**  
**Rubber-Asphalt Crack Sealer**

Property	Test Procedure	Class A		Class B	
		Min	Max	Min	Max
CRM Content, Grade A or B, % by wt.	Tex-544-C	22	26	-	-
CRM Content, Grade B, % by wt.	Tex-544-C	-	-	13	17
Virgin Rubber Content <sup>1</sup> , % by wt.		-	-	2	-
Flash Point <sup>2</sup> , COC, °F	T 48	400	-	400	-
Penetration <sup>3</sup> , 77°F, 150g, 5 sec.	T 49	30	50	30	50
Penetration <sup>3</sup> , 32°F, 200g, 60 sec.	T 49	12	-	12	-
Softening Point, °F	T 53	-	-	170	-
Bond <sup>4</sup> , 3 cycles, 20°F	Tex-525-C	-	-	pass	

<sup>1</sup>Provide certification that the min. % virgin rubber was added.

<sup>2</sup>Before passing the test flame over the cup, agitate the sealing compound with a 3/8 to 1/2-in. (9.5 to 12.7-mm)-wide, square-end metal spatula in a manner so as to bring the material on the bottom of the cup to the surface, i.e. turn the material over. Start at one side of the thermometer, move around to the other, and then return to the starting point using 8 to 10 rapid circular strokes. Accomplish agitation in 3 to 4 sec. Pass the test flame over the cup immediately after stirring is completed.

<sup>3</sup>Exception to AASHTO T 49: Substitute the cone specified in ASTM D 217 for the penetration needle.

<sup>4</sup>No crack in the crack sealing materials or break in the bond between the sealer and the mortar blocks over 1/4-in. deep for any specimen after completion of the test.

- I. Asphalt-Rubber Binders.** Asphalt-rubber binders are mixtures of asphalt binder and CRM, which have been reacted at elevated temperatures. The asphalt-rubber binders meet ASTM D 6114 and contain a minimum of 15% CRM by weight. Types I or II, containing CRM Grade C, are used for hot mixed aggregate mixtures. Types II or III, containing CRM Grade B, are used for surface treatment binder. Table 16 describes binder properties.

**Table 16**  
**Asphalt-Rubber Binders**

Asphalt-Rubber Binder Type		Type I		Type II		Type III	
Property	Test Procedure	Min	Max	Min	Max	Min	Max
Apparent Viscosity, 347°F, cP	D 2196, Method A	1500	5000	1500	5000	1500	5000
Penetration, 77°F, 100 g, 5 sec.	T 49	25	75	25	75	50	100
Penetration, 39.2°F, 200 g, 60 sec.	T 49	10	-	15	-	25	-
Softening Point, °F	T 53	135	-	130	-	125	-
Resilience, 77°F, %	D 5329	25	-	20	-	10	-
Flash Point, C.O.C., °F	T 48	450	-	450	-	450	-
Tests on Residue from Thin Film Oven Test:	T 179						
Retained Penetration Ratio, 39.2°F, 200 g, 60 sec., % of original	T 49	75	-	75	-	75	-

- J. Performance Graded Binders.** Performance graded binders must be smooth and homogeneous, show no separation when tested in accordance with Test Method Tex-540-C, and must meet Table 17 requirements.

Separation testing is not required if:

- a modifier is introduced separately at the mix plant either by injection in the asphalt line or mixer,
- the binder is blended on site in continuously agitated tanks, or
- binder acceptance is based on field samples taken from an in-line sampling port at the hot mix plant after the addition of modifiers.

**Table 17**  
**Performance Graded Binders**

Performance Grade	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day Max Pavement Design Temperature, °C <sup>1</sup>	58			64				70				76				82		
Min Pavement Design Temperature, °C <sup>1</sup>	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28
<b>ORIGINAL BINDER</b>																		
Flash Point, AASHTO T 48: Min, °C	230																	
Viscosity, AASHTO TP 48: <sup>2,3</sup> Max, 3.0 Pa•s, Test Temperature, °C	135																	
Dynamic Shear, AASHTO TP 5: <sup>4</sup> G*/sin(δ), Min, 1.00 kPa Test Temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic Recovery, ASTM D 6084, 50°F, % Min	-	-	30	-	-	30	50	-	30	50	60	30	50	60	70	50	60	70
<b>ROLLING THIN FILM OVEN (Tex-541-C)</b>																		
Mass Loss, Max, %	1.0																	
Dynamic Shear, AASHTO TP 5: G*/sin(δ), Min, 2.20 kPa Test Temperature @10 rad/sec., °C	58			64				70				76				82		

PRESSURE AGING VESSEL (PAV) RESIDUE (AASHTO PP 1)																		
PAV Aging Temperature, °C	100																	
Dynamic Shear, AASHTO TP 5: G*/sin(δ), Max, 5000 kPa Test Temperature @10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22
Creep Stiffness, AASHTO TP 1: <sup>5,6</sup> S, Max, 300 MPa, m - value, Min, 0.300 Test Temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct Tension, AASHTO TP 3: <sup>6</sup> Failure Strain, Min, 1.0% Test Temperature @1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

<sup>1</sup>Pavement temperatures are estimated from air temperatures using an algorithm contained in a TxDOT supplied computer program, may be provided by the Department or by following the procedures outlined in AASHTO MP 2 and PP 28.

<sup>2</sup>This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (AASHTO T 201 or T 202) or rotational viscometry (AASHTO TP 48).

<sup>3</sup>Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.

<sup>4</sup>For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of G\*/sin(δ) at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (AASHTO T 201 or T 202) or rotational viscometry (AASHTO TP 48).

<sup>5</sup>Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.

<sup>6</sup>If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The m-value requirement must be satisfied in both cases.

**300.3 Equipment.** Provide all equipment necessary to transport, store, sample, heat, apply, and incorporate asphalts, oils, and emulsions.

### 300.4 Construction.

**A. Typical Material Use.** Table 18 shows typical materials used for specific applications. These are typical uses only. Circumstances may require use of other material.

**Table 18**  
**Typical Material Use**

Material Application	Typically Used Materials
Hot-Mixed, Hot-Laid Asphalt Mixtures	PG Binders, Modified PG Binders, Asphalt-Rubber Types I and II
Surface Treatment	AC-5, AC-10, AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-15XP, <b>AC-20-5TR</b> , HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, Asphalt-Rubber Types II and III
Surface Treatment (Cool Weather)	RS-1P, CRS-1P, RC-250, RC-800, RC-3000, MC-250, MC-800, MC-3000, MC-2400L
Precoating	AC-5, AC-10, PG 64-22, SS-1, SS-1H, CSS-1, CSS-1H
Tack Coat	RC-250, SS-1, SS-1H, CSS-1, CSS-1H, EAP&T
Fog Seal	SS-1, SS-1H, CSS-1, CSS-1H
Hot-Mixed, Cold-Laid Asphalt Mixtures	AC-0.6, AC-1.5, AC-3, AES-300, AES-300P, CMS-2, CMS-2S
Patching Mix	MC-800, SCM I, SCM II, AES-300S
Recycling	AC-0.6, AC-1.5, AC-3, AES-150P, AES-300P, Recycling Agent, Emulsified Recycling Agent
Crack Sealing	SS-1P, Polymer Mod AE Crack Sealant, Rubber Asphalt Crack Sealers (Class A, Class B)
Microsurfacing	CSS-1P
Prime	MC-30, AE-P, EAP&T, PCE
Curing Membrane	SS-1, SS-1H, CSS-1, CSS-1H, PCE
Erosion Control	SS-1, SS-1H, CSS-1, CSS-1H, PCE

- B. Storage, Heating, and Application Temperatures.** Use storage, heating, and application temperatures in accordance with Table 19. Store and apply materials at the lowest temperature yielding satisfactory results. Follow Manufacturer's instructions for any agitation requirements in storage. Manufacturer's instructions regarding recommended application and storage temperatures supercede those of Table 19.

**Table 19**  
**Storage, Heating, and Application Temperatures**

Type - Grade	Application		Storage Maximum, °F
	Recommended Range, °F	Maximum Allowable, °F	
AC-0.6, AC-1.5, AC-3	200 - 300	350	350
AC-5, AC-10	275 - 350	350	350
AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-15XP, AC-20-5TR	300 - 375	375	360
RC-250	125 - 180	200	200
RC-800	170 - 230	260	260
RC-3000	215 - 275	285	285
MC-30, AE-P	70 - 150	175	175
MC-250	125 - 210	240	240
MC-800, SCM I, SCM II	175 - 260	275	275
MC-3000, MC-2400L	225 - 275	290	290
HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, CMS-2, CMS-2S, AES-300, AES-300S, AES-150P, AES-300P	120 - 160	180	180
SS-1, SS-1H, CSS-1, CSS-1H, PCE, EAP&T, SS-1P, RS-1P, CRS-1P, CSS-1P, Recycling Agent, Emulsified Recycling Agent, Polymer Mod AE Crack Sealant	50 - 130	140	140
PG Binders, Modified PG Binders	275 - 350	350	350
Rubber Asphalt Crack Sealers (Class A, Class B)	350 - 375	400	-
Asphalt-Rubber Types I, II, and III	325 - 425	425	425

**300.5 Measurement and Payment.** The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly, but are included in payment for other bid items.